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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/527,862

Applicant(s)

NOBLE ET AL.

Examiner

DAVID P. RASHID

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 April 2008 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CD/CD)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Amendments

[1] This office action is responsive to the claim and specification amendment received on April 23, 2008.

Drawings

[2] The replacement drawings were received on April 23, 2008. In response to applicant's drawing amendments and remarks, some of the previous drawing objections are withdrawn.

[3] The following is a quote from 37 CFR 1.84(q):

Lead lines are those lines between the reference characters and the details referred to. Such lines may be straight or curved and should be as short as possible. They must originate in the immediate proximity of the reference character and extend to the feature indicated.

[4] Fig. 1 is objected to under 37 CFR 1.84(q) for failing to properly use lead lines (*e.g.*, "Transformation Calculated" at fig. 1 is not a "reference character").

[5] The following is a quote from 37 CFR 1.84(p)(3):

Numbers, letters, and reference characters must measure at least .32 cm. (1/8 inch) in height. They should not be placed in the drawing so as to interfere with its comprehension. Therefore, they should not cross or mingle with the lines. They should not be placed upon hatched or shaded surfaces. When necessary, such as indicating a surface or cross section, a reference character may be underlined and a blank space may be left in the hatching or shading where the character occurs so that it appears distinct.

[6] Fig. 1 is objected to under 37 CFR 1.84(p)(3) for allowing letters "to interfere with its comprehension[, t]herefor, they should not cross or mingle with the lines." *See e.g.*, the letter "N" crossing the line in item 2 of fig. 1).

[7] New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because of the high number of objections. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the

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Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

[8] In response to applicant's specification amendments and remarks received on April 23, 2008, the previous specification objection is withdrawn.

Claim Rejections - 35 USC § 101

[9] In response to applicant's amendments and remarks received on April 23, 2008, the previous claim 35 USC § 101 rejection is withdrawn.

[10] 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

[11] **Claims 7-10** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Since there is no support in the original disclosure of what a "computer readable medium" is, and the "computer readable medium" may be regarded as a program on a computer which is non-statutory.

Claim Rejections - 35 USC § 112

[12] The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

[13] **Claims 1-16** are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for patient's organs, does not reasonably provide enablement for other body parts such as a ribosome, white blood cell, neuron, or plasmid. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to

enable the invention commensurate in scope with these claims. It is acknowledged that a patient's organ is a group of tissue that perform a specific function, and the invention does enable for such a large conglomeration of tissue such as an organ. However, other body parts, such as a ribosome are small enough that the disclosed invention is not enabling. It is suggested to remove "or other body part" from the independent claims.

[14] The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

[15] **Claims 7-10** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. "A computer readable medium" is not recited in the original disclosure and it is unclear what the element as disclosed is.

Claim Objections

[16] In response to applicant's amendments and remarks received on April 23, 2008, some of the previous claim objections are withdrawn

[17] The following is a quotation of 37 CFR 1.75(a):

The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

[18] **Claim 1-16** are objected to because of the following informalities:

(i) Claim 1, line 9 cites "substantially all images" but it is unclear how many images of the series of images are subjected to such a transformation, all of them?, half of them? – it is suggested to remove "substantially" to make the question definite. Claims 7 and 11 have the same equivalent argument.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

[19] The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

[20] **Claims 1-3, 5, 7-9, 11-13, and 15** are rejected under 35 U.S.C. 102(b) as being anticipated by Tracking the Left Ventricle in Echocardiographic Images by Learning Heart Dynamics, IEEE Transactions on Medical Imaging, Vol. 18, No. 3, 3/1999, pp. 282 – 290 (published March 1999, *hereinafter* “Malassiotis et al.”).

Regarding **claim 1**, *Malassiotis et al.* discloses an apparatus having means for segmenting a series of 2D (p. 287) or 3D images obtained of a patient's organ (“heart ventricle” in section I, left column, p. 282) or other body part, wherein a first segmentation is carried out on a first image of the series of images (“...first frame of the sequence.” in section I, left column, p. 283) and wherein the first segmentation is used for the subsequent segmentation of the remainder of images of said series of images (“...this basis is used to constrain the motion of the active contour in subsequent frames...” in section I., left column, p. 283), characterized in that in relation to the images

said means carry out a series of transformations (fig. 2, right column, p. 284; fig. 3, p. 285 wherein the transformation switching from the old set to the new set of snake points using contour tracking)

wherein each separate transformation embodies a fitting operation ("minimum energy solution" in right column, p. 284; section "B. Explicitly Constraining Snake Energy" on p. 286) between two images of said series of images, and

wherein substantially all images (fig. 4 on pg. 286 for all 90 frames) of the series of images are subjected to such a transformation, and

wherein the first segmentation on the first image of the series of images ("...an initial approximation of the object boundary at the first frame of the sequence.", in section I, left column, p. 283) is modified and subsequently applied to any further image of the series of images according to the transformation or sequence of transformations that fits the said first image to said further image of the series of images ("...this basis is used to constrain the motion of the active contour in subsequent frames..." in section I, left column, p. 283 wherein all further frames in the sequence are ultimately transformed based on the initial fit of the first frame's boundary (since frame N depended from frame N - 1, ..., frame 3 depended from frame 2, frame 2 depended from frame 1)).

Regarding **claim 2**, *Malassiotis et al.* discloses an apparatus according to claim 1, characterized in that each transformation relates to adjacent or immediately successive images of the series of images (it is suggested by fig. 4 that every frame in the sequence undergoes contour tracking transformation; "[t]he boundary obtained at a specific time instance was simply used as an initial value at the subsequent time instance" on p. 288).

Regarding **claim 3**, *Malassiotis et al.* discloses an apparatus according to claim 1, characterized in that there are two or more series of images (“several sequences” in section V, right column, p. 286) and that the segmentation of a first series of images is applied to all series of images (the segmentation of initial boundary estimation of the first sequence was used for all other sequences as well; a heart beat loop can also constitute a “sequence” where segmentation of the other sequences are directly segmented based on of the first sequence).

Regarding **claim 5**, *Malassiotis et al.* discloses an apparatus according to claim 3, characterized in that the respective series of images are collected at different times (Section V suggests one scanner (the “ATL HDI5000 CV scanner”) is used to test the several sequences of B-mode echocardiograms, thus they must have been performed at different times; the heart beat loop sequence also must be performed at different times).

Regarding **claim 7**, claim 1 recites identical features as in the software for an apparatus (it is inherent that the *Malassiotis et al.* is on a computer, and thus using software to perform the algorithm) of claim 7. Thus, references/arguments equivalent to those presented above for claim 1 are equally applicable to claim 7.

Regarding **claim 8**, claim 2 recites identical features as in claim 8. Thus, references/arguments equivalent to those presented above for claim 2 are equally applicable to claim 8.

Regarding **claim 9**, claim 3 recites identical features as in claim 9. Thus, references/arguments equivalent to those presented above for claim 3 are equally applicable to claim 9.

Regarding **claim 11**, claim 1 recites identical features as in claim 11. Thus, references/arguments equivalent to those presented above for claim 1 are equally applicable to claim 11.

Regarding **claim 12**, claim 2 recites identical features as in claim 12. Thus, references/arguments equivalent to those presented above for claim 2 are equally applicable to claim 12.

Regarding **claim 13**, claim 3 recites identical features as in claim 13. Thus, references/arguments equivalent to those presented above for claim 3 are equally applicable to claim 13.

Regarding **claim 15**, claim 5 recites identical features as in claim 15. Thus, references/arguments equivalent to those presented above for claim 5 are equally applicable to claim 15.

Claim Rejections - 35 USC § 103

[21] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

[22] **Claims 4 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Malassiotis et al.* in view of U.S. Patent No. 5,381,791 (issued Jan. 17, 1995, *hereinafter* “Qian”).

Regarding **claim 4**, while *Malassiotis et al.* discloses an apparatus according to claim 4, characterized in that the respective series of images are collected with ultrasound (US) means (p.

287), *Malassiotis et al.* does not teach being characterized in that the respective series of images collected with different means of monitoring selected from the group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM).

Qian teaches automatic identification of anatomical features of interest that includes being characterized in that the respective series of images collected with different means of monitoring selected from the group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM) (1:10-29).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the apparatus of *Malassiotis et al.* to include being characterized in that the respective series of images collected with different means of monitoring selected from the group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM), and ultrasound (US) as taught by *Qian* as CT and MR “produce clearly defined images”, *Qian*, 1:16-17 and NM “to provide method and apparatus which can automatically identify anatomic landmarks in nuclear medicine images, even when the images contain insufficient data to be diagnostically useful.”, *Qian*, 2:7-11.

Regarding **claim 14**, claim 4 recites identical features as in claim 14. Thus, references/arguments equivalent to those presented above for claim 4 are equally applicable to claim 14.

[23] **Claims 6, 10, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Malassiotis et al.* in view of U.S. Patent No. 5,435,310 (issued Jul. 25, 1995, *hereinafter* “Sheehan et al.”).

Regarding **claim 6**, while *Malassiotis et al.* discloses apparatus according to claim 1, wherein the images relate to a substantially sphere-like organ such as a heart, *Malassiotis et al.* does not disclose being characterized in that prior to establishing the said series of transformations, the series of images are converted to a modified series of images showing the walls of the organ in a flat plane wherein the left and right part of said plane substantially correspond to the inside and outside of said organ, and that the said series of transformations are applied to the modified series of images.

Sheehan et al. discloses determining cardiac wall thickness and motion by imaging and three-dimensional modeling that teaches a series of images (fig. 2A, item 54) are converted to a modified series of images (fig. 2B; fig. 3; fig. 4) showing the walls of the organ in a flat plane wherein the left and right part of said plane substantially correspond to the inside and outside of said organ (fig. 2B; fig. 3; fig. 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the series of images of *Malassiotis et al.* to be the modified series of images showing the walls of the organ in a flat plane wherein the left and right part of said plane substantially correspond to the inside and outside of said organ as taught by *Sheehan et al.* to create “a method for imaging and modeling a heart in three-dimensions, and more specifically, to a method for using a three-dimensional model of the heart to determine cardiac parameters.”, *Sheehan et al.*, 1:7-10 and “for analyzing cardiac parameters of a patient's heart begins with the step of imaging the heart to produce imaging data.”, *Sheehan*, 2:59-61. Consequently, the modified series of images of *Malassiotis et al.* as taught by *Sheehan et al.* would then undergo

the said series of transformations as taught by *Malassiotis et al.*, and that the series of image as taught by *Sheehan et al.* would thus be prior to establishing the series of transformations.

Regarding **claim 10**, claim 6 recites identical features as in claim 10. Thus, references/arguments equivalent to those presented above for claim 6 are equally applicable to claim 10.

Regarding **claim 16**, claim 6 recites identical features as in claim 16. Thus, references/arguments equivalent to those presented above for claim 6 are equally applicable to claim 16.

Response to Arguments

[24] Applicant's arguments filed on April 23, 2008 with respect to **claims 1-16** have been respectfully and fully considered, they are not found persuasive.

Summary of Remarks regarding Rejection Under 35 U.S.C. § 112

Applicant argues one of ordinary skill in the relevant art would readily understand that "other body part" refers to any body part capable of being imaged by the disclosed means. Thus, the specification enables the skilled artisan to practice the invention commensurate in scope with the claims.

Examiner's Response regarding Rejection Under 35 U.S.C. § 112

However, the Examiner has the right to interpret "other body part" as the broadest reasonable interpretation. *See* MPEP § 2111 (citing "[d]uring patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification.""). The Examiner must note that there exists "other body part[s]" that cannot be

performed by Applicant's invention, as the phrase can be interpreted broadly to be read as a "body part other than a patient's organ" which would include hemoglobin, white blood cells, hair follicles, etc (other than those body parts capable of being imaged by the disclosed means).

Furthermore, the Examiner has respectfully noted the following that the Applicant should take into consideration in an effort to expedite prosecution.

Claim 1 contains a preamble "[a]n apparatus" following by the transitional phrase "having". The apparatus of claim 1 contains one elements that invokes 35 U.S.C. § 112 para. 6, a "means for segmenting..." This "means for" language could be performed solely by a program, which would then invoke 35 U.S.C. § 101.

Claim 7 does not contain a proper transitional phrase (other than possibly "arranged"). The apparatus claim however, does not have any elements, of which can all be considered intended usage. The current prior art of record anticipates claim 7 for intended usage alone as the claim can be regarded as having no patentable weight.

Claim 11 may be considered a complete preamble with no transitional phrase and body of the claim. This type of claim may be considered a "use" claim. *See* MPEP § 2173.05(q). The prior art used to reject claim 11 anticipates because claim 11 standing as a "use" claim is pure intended usage. It is suggested to amend claim 11 such that it is not a "use" claim, as the claim can be regarded as having no patentable weight.

Summary of Remarks regarding claims 1-3, 5, 7-9, 11-13, and 15

(i) Applicant argues that *Malassiotis et al.* does not disclose or contemplate Applicants' claimed apparatus and software which is capable of segmenting a series of 2D or 3D images of a subject's body part where a first segmented image is modified for the subsequent segmentation of the remainder of images of an image series according transformation or sequence of transformations that fits the first image to any further image. Rather, *Malassiotis et al.* discloses estimating and refining an LV boundary and then constraining the motion of the boundary.

(Applicant Resp. at 12, Apr. 23, 2008.)

(ii) Further, *Malassiotis et al.* discloses only use of a Hough transform technique to find an initial approximation of the object boundary. In contrast, Applicants' invention allows for any type of segmentation to be applied initially as the first segmentation on the first image. (Resp. at 12.)

(iii) Moreover, *Malassiotis et al.* discloses only echocardiogram images, while the initial image for Applicants' invention may be collected by virtually any monitoring means including but not necessarily limited to MR, CT, NM and US. (Resp. at 12.)

Examiner's Response regarding claims 1-3, 5, 7-9, 11-13, and 15

(i) However, though Applicant's correct assessment of *Malassiotis et al.* disclosing the estimating and refining an LV boundary and then constraining the motion of the boundary is true, the claim in question is broad enough to be anticipated by *Malassiotis et al.* The prior art uses a "dynamic programming algorithm" (p. 284) that is run on a computer. See fig. 5 (showing a monitor displaying the results of the dynamic programming algorithm run on a computer). The dynamic programming algorithm of *Malassiotis et al.* is capable of segmenting a series of 2D

(the images of fig. 5 are segmented) or 3D images of a subject's body part where a first segmented image is modified for the subsequent segmentation of the remainder of images of an image series according transformation or sequence of transformations that fits the first image to any further image ("...this basis is used to constrain the motion of the active contour in subsequent frames..." in section I, left column, p. 283 wherein all further frames in the sequence are ultimately transformed based on the initial fit of the first frame's boundary (since frame N depended from frame N - 1, ..., frame 3 depended from frame 2, frame 2 depended from frame 1)). In other words, frame N will always depend from frame 1 because frame N-1 depended from frame 1. Frame 1 is the "basis" of all subsequent frames in time, as frame 2 is frame 1 updated, frame 3 is frame 2 updated (that was updated from frame 1), and so forth.

(ii) Though the Examiner understands Applicants' invention discloses any type of segmentation to be applied initially as the first segmentation on the first image, the claims are broad enough to incorporate this interpretation, as well as the interpretation of the Examiners. Claim 1 does not incorporate Applicant's argument and limitation.

(iii) However, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the apparatus of *Malassiotis et al.* to include being characterized in that the respective series of images collected with different means of monitoring selected from the group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM), and ultrasound (US) as taught by *Qian* as CT and MR "produce clearly defined images", *Qian*, 1:16-17 and NM "to provide method and apparatus which can automatically identify anatomic landmarks in nuclear medicine images, even when the images contain insufficient data to be diagnostically useful.", *Qian*, 2:7-11.

Summary of Remarks regarding claims 4 and 14

Malassiotis et al. does not disclose or contemplate Applicants' claimed apparatus and software which is capable of segmenting a series of 2D or 3D images of a subject's body part where a first segmented image is modified used for the subsequent segmentation of the remainder of images of an image series according transformation or sequence of transformations that fits the first image to any further image. (see e.g., Claims 1 and 7). *Malassiotis et al.* instead discloses estimating and refining an LV boundary and then constraining the motion of the boundary. (Resp. at 13.)

Contrary to the Examiner's assertion, *Qian* does not teach or otherwise suggest a Col. 1, lines 10-29 collecting images for use in *Qian*'s method with MR, CT. In short, *Qian* does not remedy the deficiencies of *Malassiotis et al.* (Resp. at 13-14.)

Examiner's Response regarding claims 4 and 14

However, Applicant's first argument is unpersuasive in light of the fact *Malassiotis et al.* discloses a "contour tracking algorithm" that anticipates the broad language of claim 1. All subsequent images in the sequence are derived from the first image in the sequence. See above.

The difference between claim 1 and claim 4 is that while *Malassiotis et al.* discloses an apparatus characterized in that the respective series of images are collected with ultrasound (US) means (p. 287), *Malassiotis et al.* does not teach being characterized in that the respective series of images collected with different means of monitoring selected from the group magnetic resonance (MR), computed tomography (CT), nuclear medicine (NM), and ultrasound (US) (as opposed to collected with the same means). This is the only difference between what

Though *Malassiotis et al.* discloses echocardiogram images, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the apparatus of *Malassiotis et al.* to include being characterized in that the respective series of images collected with different means of monitoring selected from the group magnetic resonance (MR), computed tomography (CT), and nuclear medicine (NM), and ultrasound (US) as taught by *Qian* as CT and MR “produce clearly defined images”, *Qian*, 1:16-17 and NM “to provide method and apparatus which can automatically identify anatomic landmarks in nuclear medicine images, even when the images contain insufficient data to be diagnostically useful.”, *Qian*, 2:7-11.

Summary of Remarks regarding claims 6, 10, and 16

Contrary to the Examiner's assertion, these Figures do not necessarily show the walls of the heart in a flat plane wherein the left and right part of the plane substantially correspond to the inside and outside of the organ. In all of these Figures inside and outside portions of the heart are clearly represented on both the left and right parts of the plane (i.e. over the entire image). (Resp. at 14.)

Thus, by the legal criteria discussed above, and by the underlying facts of the content of the cited prior art and of the present pending claims, it is clear that the combination of *Malassiotis et al.* and *Sheehan* fails to teach or suggest all the limitations of any of Claims 6, 10 or 16 of Applicants' invention. Additionally, *Sheehan* fails to cure any of the remedies of *Malassiotis et al.* with respect to the other claims discussed above. Thus, a *prima facie* case has not been made that Applicants' invention is obvious. (Resp. at 14-15.)

Examiner's Response regarding claims 6, 10, and 16

“[T]hese Figures [[do]] not necessarily show[ing] the walls of the heart in the flat plane...” argument by the Applicant is unpersuasive, as for example fig. 2A of *Sheehan et al.* shows determining cardiac wall thickness and motion by imaging and three-dimensional modeling that teaches a series of images (fig. 2A, item 54) are converted to a modified series of images (fig. 2B; fig. 3; fig. 4) showing the walls of the organ in a flat plane wherein the left and right part of said plane substantially correspond to the inside and outside of said organ (fig. 2B; fig. 3; fig. 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the series of images of *Malassiotis et al.* to be the modified series of images showing the walls of the organ in a flat plane wherein the left and right part of said plane substantially correspond to the inside and outside of said organ as taught by *Sheehan et al.* to create “a method for imaging and modeling a heart in three-dimensions, and more specifically, to a method for using a three-dimensional model of the heart to determine cardiac parameters.”, *Sheehan et al.*, 1:7-10 and “for analyzing cardiac parameters of a patient's heart begins with the step of imaging the heart to produce imaging data.”, *Sheehan*, 2:59-61. Consequently, the modified series of images of *Malassiotis et al.* as taught by *Sheehan et al.* would then undergo the said series of transformations as taught by *Malassiotis et al.*, and that the series of image as taught by *Sheehan et al.* would thus be prior to establishing the series of transformations.

Conclusion

[25] The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 4953554 A; US 5680862 A; US 5757953 A; US 5800355 A; US 6120453 A; and US 20020072670 A1.

[26] THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).]

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

[27] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578. The examiner can normally be reached Monday - Friday 7:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-74155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/David P. Rashid/

Examiner, Art Unit 2624

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